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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/672,281	09/28/2000	Gustavo R. Paz-Pujalt	81639RLO	9171

7590 05/21/2004

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EXAMINER	
MARIAM, DANIEL G	
ART UNIT	PAPER NUMBER
2621	

DATE MAILED: 05/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/672,281	Applicant(s) PAZ-PUJALT ET AL.	
	Examiner DANIEL G MARIAM	Art Unit 2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 March 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *3*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Response to Amendment

1. In response to the Office Action mailed on November 28, 2003 applicants have submitted an amendment filed on March 10, 2004, amending independent claims 1, 6, 9, and 10; and arguing to traverse the rejection of pending claims 1-12.

Response to Arguments

2. Applicants' arguments with respect to claims 1-12 as amended have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1, 2, 4-5, and 9 are rejected under 35 U.S.C. 102(e) as being anticipated by Ferguson, et al. (6,615,648).

With regard to claim 1, Ferguson, et al. discloses a method for capturing images of ground locations and for detecting the presence of material failure(s) or failures, i.e., crack/s and/or pavement deterioration, in man-made structures, i.e., road pavement, in such ground locations (See for example, col. 1, lines 7-11) comprising the steps of: (a) providing an image sensor, i.e., digital camera and/or image acquisition unit, spaced remotely from the ground (the digital camera is mounted on a vehicle so as to capture images of the road surface as the vehicle moves from one point to the other) and which sequentially captures a number of images of

various ground locations to provide digital images (See for example, col. 3, lines 48; and See "image acquisition module" in Fig. 8); (b) processing captured digital images to determine the presence of a potential material failure, i.e., crack/s and/or deterioration of pavement, in an immobile or inert man-made structure, i.e., road, in accordance with predetermined coordinate positions which locate the man-made structures in one or more of the captured digital images (See for example, col. 3, lines 53-67; and col. 10, line 48 through col. 11, line 67); and (c) indicating to a customer, i.e., user or operator, that a potential material failure has been detected, i.e., reporting and/or providing feedback as to as to the condition of the pavement, such as cracking, in a predetermined coordinate position (See for example, col. 3, lines 55-56; and col. 12, line 50-col. 13, line 22).

With regard to claim 2, the method of claim 1 further including: (d) sending captured processed digital images with detected potential material failures to a customer (See for example, col. 12, line 50 – col. 13, line 22).

With regard to claim 4, the method according to claim 1 wherein the digital images are captured by a capture device which is located in a fixed structure position above the ground location or in a moving structure such as an aircraft or satellite (See for example, in Fig. 8, which shows the camera being mounted on a vehicle which is indeed above ground).

With regard to claim 5, the method of claim 3 wherein the image processing includes storing in memory a representation of different material failures, i.e., longitudinal cracking and transverse cracking, to be detected and comparing the captured digital image with the material failures to determine the presence of a material failure, type of material failures and location of the material failures (See for example, col. 11, line 28 through col. 12, line 22).

Claim 9 is rejected the same as claim 1. Thus, argument similar to that presented above for claim 1 is equally applicable to claim 9. Claim 9 distinguishes from claim 1 only in that it recites the limitation "correcting material failures". Ferguson, et al. (col. 2, lines 33-36; and col. 4, lines 31-35) further teaches correcting, i.e., maintenance, material failures, i.e., cracks.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ferguson, et al. (6,615,648) in view of Murphy, et al. (5,126,654).

With regard to claim 6, claim 1 encompasses the limitation of this claim. Thus arguments analogous to that presented above for claim 1, are not repeated herein, but are incorporated by reference. Claim 6 distinguishes from claim 1 only in that it recites the limitation detecting the presence of material failure(s) or failures in man-made structures having a detectable chemical agent. While Ferguson, et al. discloses all of the claimed subject matter, Ferguson, et al. is silent as to the introduction of chemical agent used to detect the presence of material failure in man made structure(s). However, Murphy, et al. detects a pipeline (which is stationary as is the road surface discussed above in the Ferguson, et al reference) failure by using corrosion, which is an electrochemical process which involves metal oxidation and mass and charge transport between an electrode and a surrounding electrolyte (See for example, col. 1, lines 32- 36).

Ferguson, et al. and Murphy, et al. are combinable because they are from the same field of endeavor, i.e., failure detection in man-made structures, i.e., pipeline (See col. 1, lines 32-33). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the teaching of Murphy, et al. with Ferguson, et al. The motivation for doing so is to provide a chemical substance, and to do so would at least aid the process of identifying failures in man made structures, such as pavement cracks, pipeline failure, etc. Therefore, it would have been obvious to combine Murphy, et al. with Ferguson, et al. to obtain the invention as specified in claim 6.

With regard to claim 7, the method of claim 6 wherein the chemical agent includes materials which when leaked from a receptacle are adapted to be detected (col. 1, lines 41-49 of Murphy, et al.).

With regard to claim 8, the method of claim 6 wherein the chemical agent includes materials which when released react with substances, i.e., soil, in the ground to provide a detectable material failure to the image sensor (See for example, col. 1, lines 38-44 of Murphy, et al.).

7. Claims 3, 10, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ferguson, et al. (6,615,648).

Claim 10 is rejected the same as claim 9. Thus, arguments analogous to that presented above for claim 9 are not repeated herein, but are incorporated by reference. Claim 10 distinguishes from claim 9 only in that it recites enabling the customer to make payment to the service provider for the detection of the material failure. This feature is obvious if not inherent because a payment is required since the data acquisition vehicle shown in Figure 8 requires a

gasoline to move the vehicle from one point to another and it also requires a driver to drive the vehicle when collecting the road crack data. What this means is that, these expenses must paid by somebody, a customer or users of the road, or authorized person/s, whose seeking such a report (road pavement cracks) so as to establish a maintenance plan and budget to fix the deterioration of the road (See for example the statement made on col. 4, lines 22-34).

With regard to claim 3, the method of claim 1 wherein the digital image processing includes comparing previously captured digital images with newly captured digital images to determine variations in the captured digital images at the predetermined coordinates which indicate a potential material failure in a manmade structure. Ferguson, et al. does not explicitly call for comparing previously captured digital images with newly captured digital images to determine variations in the captured digital images at the predetermined coordinates which indicate a potential material failure in a manmade structure. Instead, Ferguson, et al. uses a predetermined threshold as a condition to determine the various road cracks (See for example, col. 11, line 53 through col. 12, line 10). It would have been a matter of design choice to modify the thresholding technique taught by Ferguson, et al. by replacing it with previously captured images to make a determination of material failure, since no new or unexpected results are seen to be attained by having previously captured digital images for the purpose of detecting the presence of material failure, and it appears that the thresholding technique used in Ferguson, et al would perform equally well to determine the material failure, i.e., road cracks.

Claim 12 is rejected the same as claim 3. Thus, argument analogous to that presented above for claim 3 is equally applicable to claim 12.

8. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ferguson, et al. (6,615,648) in view of Murphy, et al. (5,126,654).

With regard to claim 11, Ferguson discloses all of the claimed subject matter as already set forth above in paragraph 7, and incorporated herein by reference. Ferguson, et al. is silent as to the providing a chemical agent that includes which materials when released reacts with substances in the ground to provide a detectable material failure to the image sensor. However, Murphy, et al. detects a pipeline (which is stationary as is the road surface discussed above in the Ferguson, et al reference) failure by using corrosion, which is an electrochemical process which involves metal oxidation and mass and charge transport between an electrode and a surrounding electrolyte (See for example, col. 1, lines 32- 36; and col. 1, lines 38-44).

Ferguson, et al. and Murphy, et al. are combinable because they are from the same field of endeavor, i.e., failure detection in man-made structures, i.e., pipeline (See col. 1, lines 32-33). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the teaching of Murphy, et al. with Ferguson, et al. The motivation for doing so is to provide a chemical substance, and to do so would at least aid the process of identifying failures in man made structures, such as pavement cracks, pipeline failure, etc. Therefore, it would have been obvious to combine Murphy, et al. with Ferguson, et al. to obtain the invention as specified in claim 11.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US Patent Numbers: 5042055, 4653316, and 5656786; a publication to DeVault "Robotic System for Underwater Inspection of Bridge Piers".

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to DANIEL G MARIAM whose telephone number is 703-305-4010. The examiner can normally be reached on M-F (7:00-4:30) FIRST FRIDAY OFF.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, LEO BOUDREAU can be reached on 703-305-4607. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DANIEL MARIAM
PRIMARY EXAMINER

May 20, 2004